MEA 2014–2015

Science Grade 5

The table below shows the entire fifth-grade science test design. Scores are based on common items only, half of which are released and can be found in this document.

Test Design

Content Area	Common		Field Test Items		Total Items per Student		Base Testing Time	Points
	MC	CR	MC	CR	MC	CR		
Science	32	4	8	1	40	5	90 min.	48

Each item on the MEA measures a content standard of Maine's 2007 *Learning Results*.

Science Content Standards Assessed on the MEA

D. The Physical Setting
1. Universe and Solar System
2. Earth
3. Matter and Energy
4. Force and Motion

E. The Living Environment
1. Biodiversity
2. Ecosystems
3. Cells
4. Heredity and Reproduction
5. Evolution

Item Information Chart

Please refer to the item information chart on the next page for in-depth information on each science released item. The released item numbers in the chart correspond to item numbers in the practice test and on the MEA Item Analysis Report.

Constructed-Response Scoring Guides

A constructed-response scoring guide includes score point descriptions used to determine the score. Training notes that follow the scoring guide provide in-depth descriptions or particular information also used to determine the score.

Student Work

At least one sample student response is provided for each score point with annotations that explain the reasoning behind the assigned score.

Grade 5 Science Released Item Information

Released Item Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Practice Test Page Number	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	5	6	6
Content Strand (Maine 2007 *Learning Results*)	E2	D1	D3	E4	D4	E5	E2	D1	D1	E5	E4	D2	E2	D3	E3	D3	D2	E1
Depth of Knowledge Code	1	1	3	2	2	3	2	2	2	2	2	2	1	2	1	3	2	3
Item Type	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	CR	CR
Possible Points	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4
Answer Key	D	A	C	B	C	B	D	A	D	C	C	B	A	C	B	D		
% Who Chose A or Earned 1 Point	11	87	15	4	20	6	4	72	4	2	40	14	35	16	6	9	32	5
% Who Chose B or Earned 2 Points	7	6	10	84	2	68	2	7	8	1	5	64	16	19	75	12	22	21
% Who Chose C or Earned 3 Points	6	6	56	5	73	10	4	15	2	93	45	11	28	53	13	6	9	50
% Who Chose D or Earned 4 Points	76	1	18	7	5	14	88	6	86	4	10	10	20	12	5	73	2	19
Statewide Average Student Score																	1.09	2.75

Content Strands: See "MDOE Regulation 132–*Learning Results: Parameters for Essential Instruction*" at http://www.maine.gov/education/lres/pei/index.html.

Item Type: MC = multiple choice, CR = constructed response

Answer Key: the letter of the correct answer choice

MEA Science Grade 5 Released Items – Student Work

Constructed-Response Item 17

17 The shape of Earth's surface is changing all the time.

a. Describe **two** ways that water, in its various forms, can change the shape of Earth's surface.

b. Describe **two** ways that forces other than water can change the shape of Earth's surface.

Be sure to label parts a and b in your answer booklet.

Scoring Guide for Constructed-Response Item 17

Score	Description
4	The response demonstrates a thorough understanding of how wind, waves, water, and ice reshape Earth's surface. The response describes two ways that water changes Earth's surface and two ways forces other than water change Earth's surface. The response contains no errors or omissions.
3	The response demonstrates a general understanding of how wind, waves, water, and ice reshape Earth's surface. The response contains an error or omission.
2	The response demonstrates a limited ability to explain how wind, waves, water, and ice reshape Earth's surface. The response contains errors and omissions.
1	The response demonstrates a minimal ability to explain how wind, waves, water, and ice reshape Earth's surface. The response is minimal.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Training Notes for Constructed-Response Item 17

a. Ways that water changes Earth's surface:

Liquid water:

- rivers – movement carries materials along and erodes Earth's surface
- rivers – carving out valleys and forming deltas
- rain – runoff carries particles, floods move Earth materials, rain dissolves rocks, acid rain also dissolves rocks
- ponds, lakes – buildup of organic material creates bogs, soil, etc.
- waves – shapes the shoreline of lakes and oceans (sandbars)
- waves – break up rocks
- acid rain – changes surfaces

Solid water (ice):

- weathering and breaking down rocks by freezing and thawing
- glaciers carving out valleys

b. Ways that other forces can change Earth's surface:

- Wind – blowing sand and soil forming sand dunes and banks of soil, erosion
- Lightning – starting fires, burning ground, breaking rocks
- Earthquakes – dividing ground, breaking apart rocks
- Volcanoes – making new rock surfaces, making places for lakes to form
- Organisms – making coral reefs, plants breaking rocks apart, soil organisms, etc.
- Human activity – anything that changes Earth's surface
- Fire – heat causes rocks to crack and split off

a. Two ways water can change the shap of the Earth's surface are the waves of the ocean can grind down rocks on the coast line, and rivers can make deep cuts in the earth.

b. Two ways that forces other than water can change the shape of the Earths surface are volcanic eruptions when the lava flows into the ocean it creats new land. Another way are earthquakes. Earthquakes can move boulders around and make them colide with other things, thus grinding both the boulder and the thing it colided with smaller.

Summary annotation statement:

This response gives two legitimate ways that water changes the Earth's surface in part (a), wave movement wearing down rocks and rivers making "deep cuts" [accepted as carving valleys]. In part (b), lava and earthquake discussions are both acceptable for credit. This response is thorough and receives a score of 4.

a. Water can change the Earth's surface overtime because of erosion. If it rains a lot then rocks and stuff like that can erode. Another way is ice. Lets say that it's really cold one day and the water freezes underground. The next day is really warm and all the ice thaws out. The surface gets all cracked up. That's why all the roads around here are cracked.

b. Machines can change how the earth is. Excavators move dirt to new places. Bulldozers can push dirt, changing the surface. People can, too. We have shovels that can dig up earth.

Summary annotation statement:

This response gives two legitimate ways that water changes the Earth's surface in part (a), erosion and ice [cracking surfaces apart]. In part (b), response only names one way [human activity] the Earth's surface is changed. This response is general and receives a score of 3.

A. the water can take away sand from beaches making it smaller. Also a sunomee might come and distroy a mountian or hill.

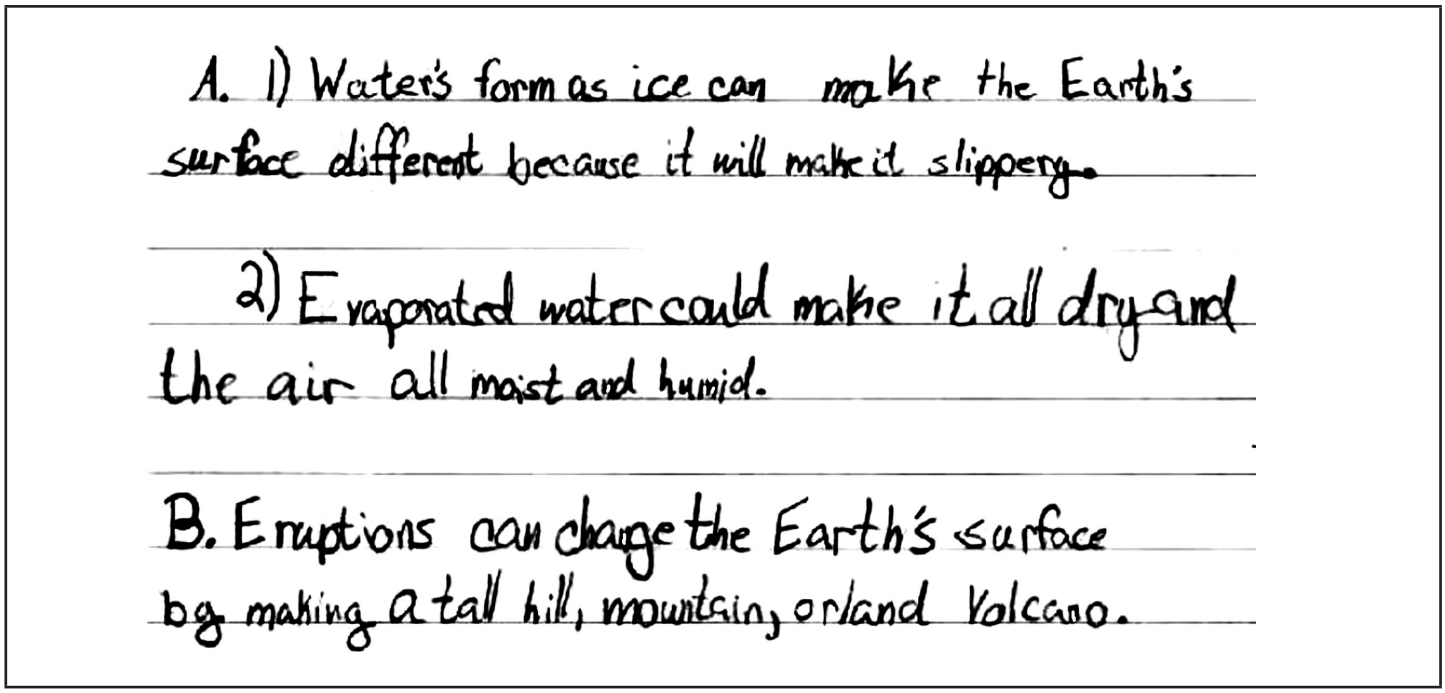
B.

Wind could come and grind down the earth surfise or it could pick up sand and move it someplace else. Also there might be hail and it might also grind down the earth by hitting it so much.

Summary annotation statement:

This response only gives one legitimate way that water changes the Earth's surface in part (a), water moving sediment around. In part (b), the wind discussion is creditable. Hail is not given credit as it is a form of water. This response is limited and receives a score of 2.

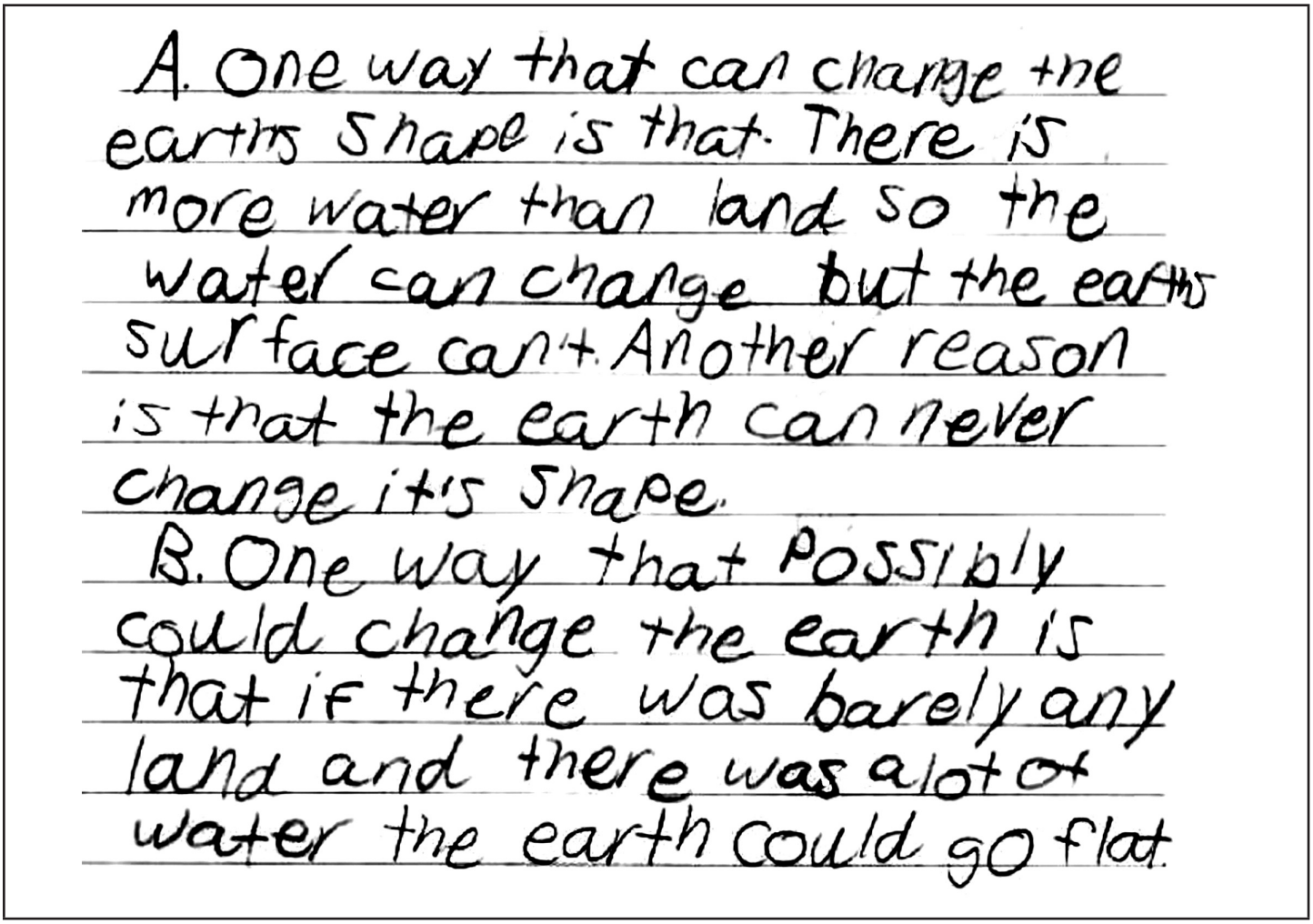
Sample 1-Point Response with Annotations for Constructed-Response Item 17



Summary annotation statement:

This response does not give anything creditable in part (a); neither reason given is a way that water changes the Earth's surface. In part (b), only one way [volcanic eruptions] is given. As a result this is considered a minimal response and receives a score of 1.

Sample 0-Point Response with Annotations for Constructed-Response Item 17

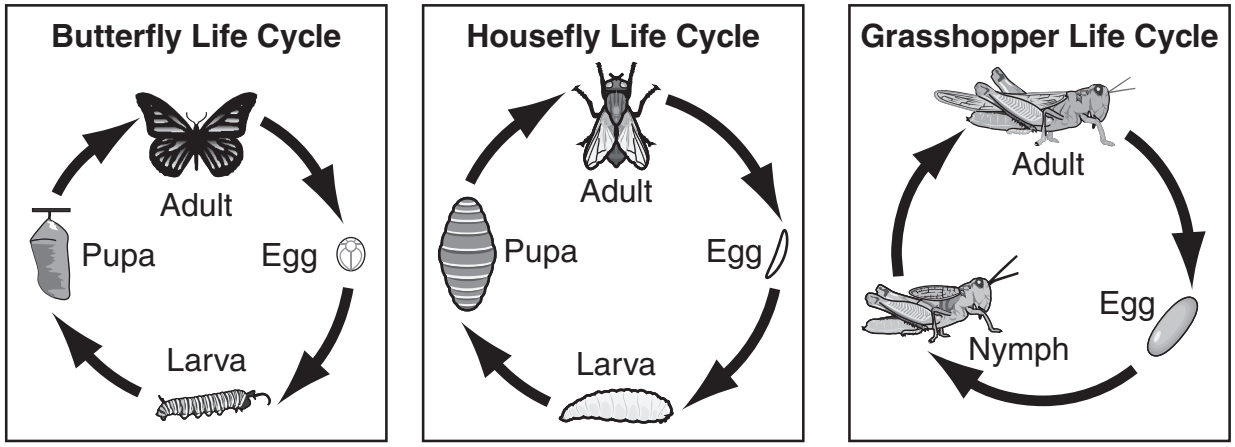

A. One way that can change the earths shape is that. There is more water than land so the water can change but the earths surface can't. Another reason is that the earth can never change it's shape.
B. One way that possibly could change the earth is that if there was barely any land and there was a lot of water the earth could go flat.

Summary annotation statement:

This response does not given any creditable ways that water changes the Earth's surface in part (a). No credit is awarded in part (b) as it discusses water in addition to naming a misconception that if "there was a lot of water the earth could go flat." As a result this response earned no credit.

Constructed-Response Item 18

18 Three insect life cycles are shown in the diagrams below.



a. Based on the diagrams, identify which insects have the same life stages.

b. Based on the diagrams, identify which insects have different life stages.

c. Sort the insects into two groups. Be sure to include labels. Use evidence from the diagrams to support your response.

Be sure to label parts a, b, and c in your answer booklet.

Scoring Guide for Constructed-Response Item 18

Score	Description
4	The student demonstrates a thorough understanding of how organisms can be compared based on how they appear in different life stages. The response identifies the insects that have the same and different life cycle AND groups the insects into two groups with supporting evidence. The response has no errors or omissions.
3	The response demonstrates a general understanding of how organisms can be compared based on how they appear in different life stages. The response has an error/ omission.
2	The response demonstrates a limited understanding of how organisms can be compared based on how they appear in different life stages. The response has errors/ omissions.
1	The response demonstrates a minimal understanding of how organisms can be compared based on how they appear in different life stages. The response has one piece of correct information.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response.

Training Notes for Constructed-Response Item 18

a. Housefly and butterfly share the same life stages.

b. Possible correct responses may include:
   - Butterflies or houseflies [have one more stage than grasshoppers.]
   - Grasshoppers [lack larva and pupa stage.]

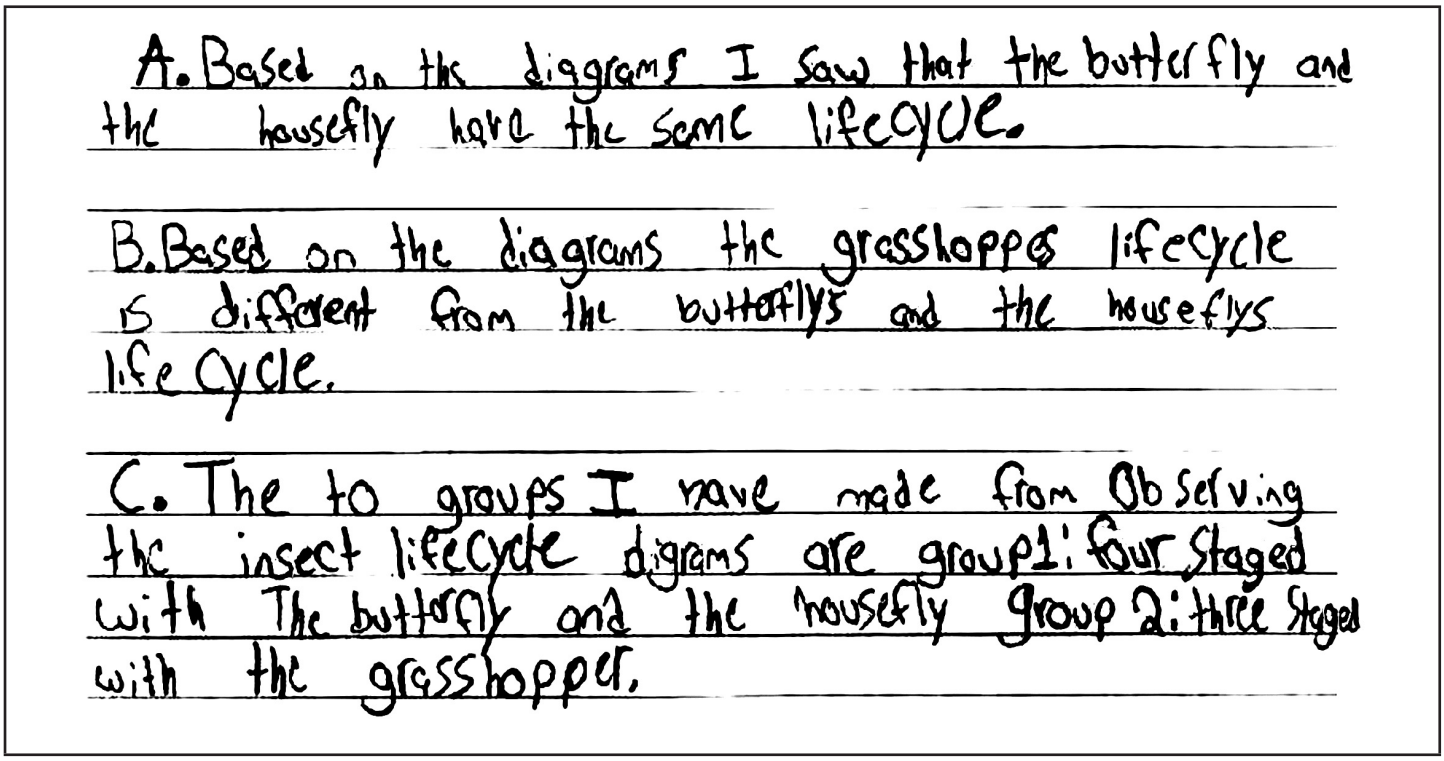
c. Response must include a clear and organized response that sorts houseflies and butterflies separately from grasshoppers. The response may be pictorial or textual or a combination of both, so that the delineation between organisms (classification) is clear and the reasoning is evident.

A. On the diagram the butterfly and the housefly have the same lifecycle.
B. In the diagram the grasshopper has a different lifecycle than the butterfly and housefly.
C. The first group is the butterfly and the housefly. I put them in the same group because they both start as an egg and go to the larva, pupa, and adult. The grasshopper is in group 2 because they start at egg and go to nymph and adult.

Summary annotation statement:

This response correctly addresses part (a) and (b). In part (c), the response clearly and correctly places the three insects into two groups and uses the diagrams to describe how they were sorted into the two groups. This response is thorough and receives a score of 4.

Sample 3-Point Response with Annotations for Constructed-Response Item 18


A. Based on the diagrams I saw that the butterfly and the housefly have the same lifecycle.

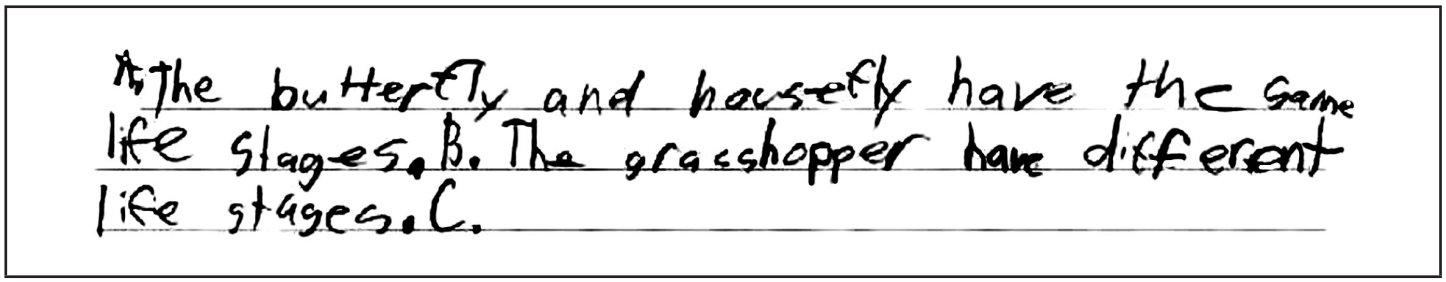
B. Based on the diagrams the grasshoppes lifecycle is different from the butterflys and the houseflys life cycle.

C. The to groups I have made from Observing the insect lifecycle digrams are group1: four Staged with The butterfly and the housefly group 2: three Staged with the grasshopper.

Summary annotation statement:

This response correctly addresses part (a) and (b). In part (c), the response correctly groups the insects and provides appropriate labels, but fails to cite specific evidence from the diagram to support the groupings. This response is general and receives a score of 3.

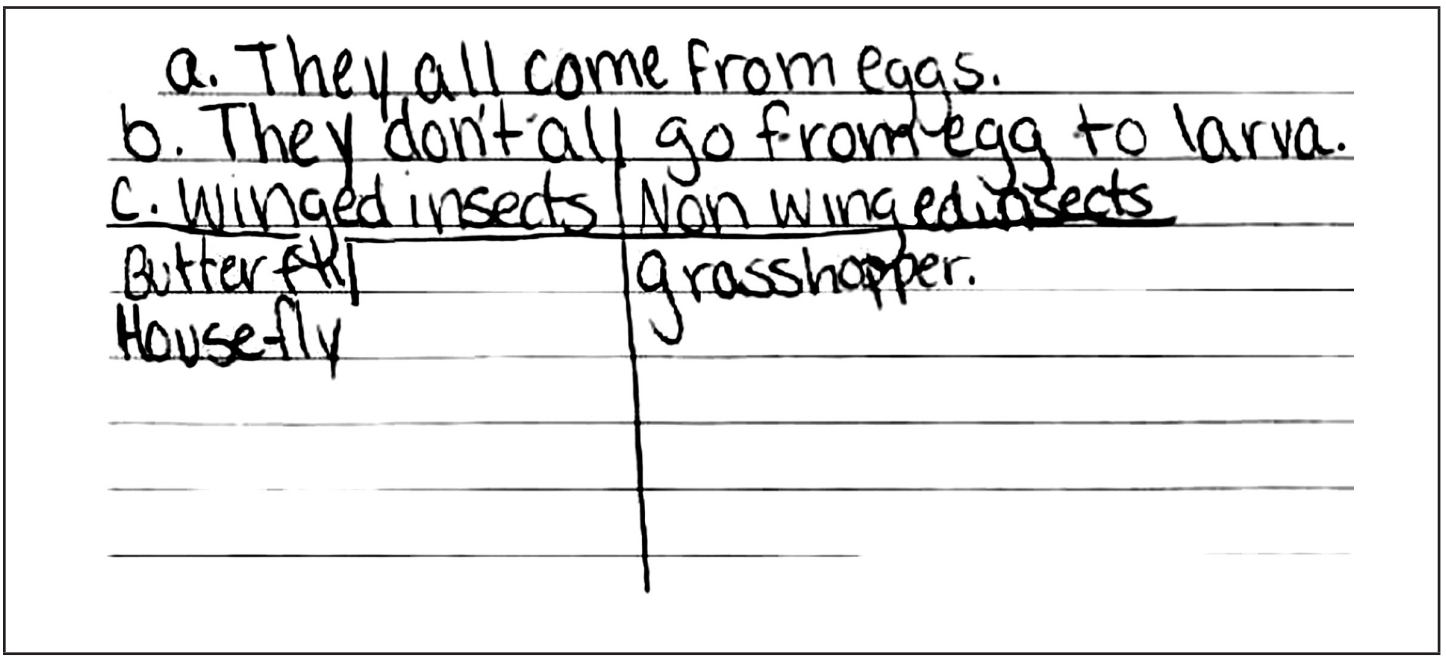
Sample 2-Point Response with Annotations for Constructed-Response Item 18



Summary annotation statement:

This response correctly addresses part (a) and (b). Part (c) was not attempted. This response is limited and receives a score of 2.

Sample 1-Point Response with Annotations for Constructed-Response Item 18



Summary annotation statement:

Parts (a) and (b) fail to address the prompt and earn no credit. Part (c) correctly sorts and labels the insects. Because it is unclear from the diagram whether or not the grasshopper has wings, there is no penalty for this type of sorting. This is a minimal response and earns a score of 1.

Sample 0-Point Response with Annotations for Constructed-Response Item 18

frist it shaped as and egg.
next it will come out as and
pupa. then it will come out
as a larva. last it turns
In to a butter fiy.

Summary annotation statement:

This response provides a narrative description of the butterfly life cycle diagram without any comparisons between the insects referenced. As a result this response earns no credit.